A741

DAK INDUSTRIES, INC.

new 48 hr. mail order service

Test Check

What to look for in cassettes

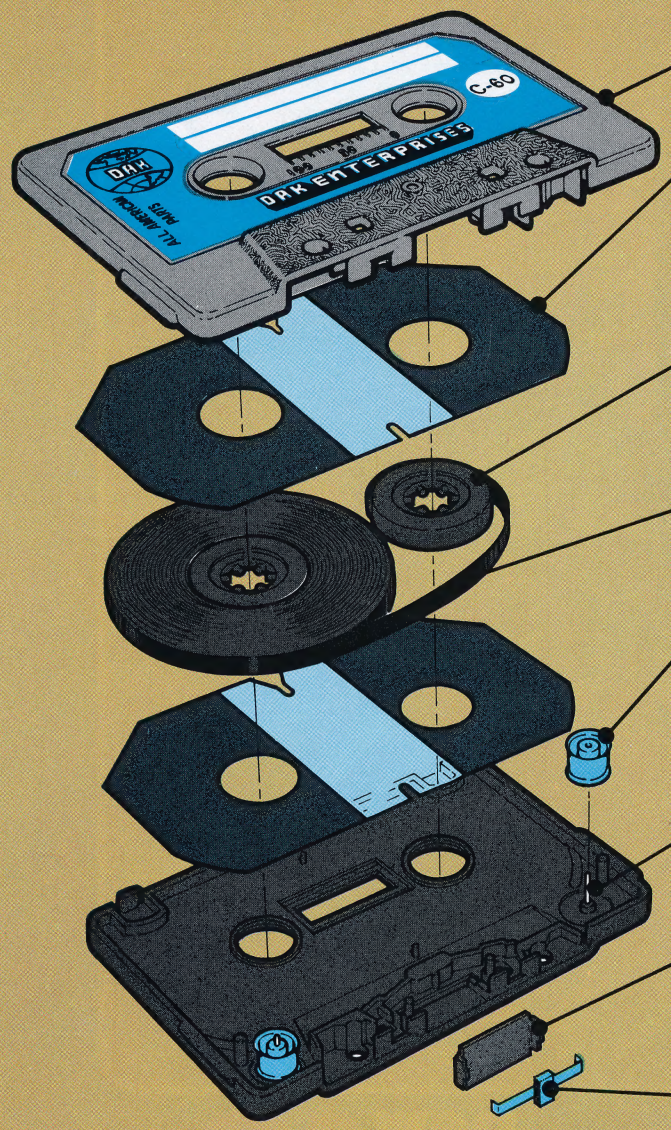
Exceptional performance from any brand or type of cassette depends essentially on four things:

First, the cassette tape, itself, should be of high quality. Most high quality tape has a polyester base, silicone lubricant, a heavy-duty binder, and good high-density magnetic particle dispersion. All DAK cassette tape meets these requirements.

Second, the cassette components are vital. The highest quality tape is almost worthless if it is housed in a cheap cassette body. Cheap components may, in time, even jam-up or damage your unit. Listed below are eight important components whose quality can radically affect the performance of a cassette or unit.

Third is quality workmanship. Some of the best-known brands employ U.S. components but assemble their cassettes in foreign countries! (By law, they must be so labeled). All DAK cassettes are made, and assembled, in the United States to ensure their superior quality.

Fourth, your equipment must be kept clean and properly serviced to guarantee reliable performance. A unit with dirty heads or heavily magnetized parts can ruin even the best quality cassettes. Likewise, good quality cassettes can help your unit remain in adjustment, stay cleaner, and even extend its playing life.



	DAK	Maxell	BASF	Medium Price	Cheapy
1. High heat precision housing performs up to 160 degrees.	X	X	X	std. plastic	std. plastic
2. Graphite or teflon lubricated polyester shield gasket, gives low friction tape movement in any climate.	X	X	X	X	wax paper
3. Precision, self-lubricating hubs and clips reduce friction & give smooth tape wrap.	X	X	X	std. plastic	std. plastic
4. Silicone lubricated, high-density oxides and the finest polyester.	X	X	X	?	?
5. Rolling double flanged, self-lubricating idler rollers ensure proper tape alignment and low friction.	X	X	X	straight rollers	nothing!
6. Stainless steel pin for smooth, low friction tape movement.	X	X	X	plastic pin	post
7. Heavy mu-metal shield ensures low hiss level due to stray magnetic fields.	X	X	X	tin shield	no shield
8. Beryllium copper pressure pad spring permits optimum pressure for head to tape contact.	X	X	X	X	sponge

Cassettes

DAK standard output

Price includes labels
Soft box pictured available below cassette prices

normal range cassettes

All DAK Standard Output Cassettes contain a gamma ferric, silicone lubricated, calendered, oxide coated tape of the finest quality polyester available.

The mechanical components utilized by these cassettes (and *all other* DAK cassettes) are of the unsurpassed quality described, in detail, on the "Test Check" page of this catalog.

Standard Output Cassettes come from DAK with a lifetime guarantee.

stock #	playing time	retail value	DAK direct prices! 1-48	49-143	144 . . .
C30	30 min.	$ .99	$ .46	$ .43	$ .42
C60	60 min.	$1.29	$ .53	$ .50	$ .49
C90	90 min.	$1.89	$ .77	$ .74	$ .72
C120	120 min.	$2.49	$ .97	$ .94	$ .92

Soft plastic box $ .07
Hard plastic box $ .11
Deluxe Hinged Cardboard Mailable Box $ .05

Performance Characteristics

DAK Standard Output Cassettes are recommended for all general voice, duplicator, and educational needs.

Shipping weight listed on order blank

Cassettes

DAK low noise high output

Price includes labels
Hard box pictured available below cassette prices

low noise cassettes

All DAK Low Noise—High Output Cassettes have a higher density, fine magnetic particle dispersion, highly calendered, and inherent low noise qualities that produce a response capability in excess of 22,000 Hz.

The mechanical components utilized by these cassettes (and *all other* DAK cassettes) are of the unsurpassed quality described, in detail, on the "Test Check" page of this catalog.

Low Noise—High Output Cassettes come from DAK with a lifetime guarantee.

stock #	playing time	retail value	DAK direct prices! 1-48	49-143	144 . . .
LNC30	30 min.	$1.84	$ .59	$ .56	$ .55
LNC60	60 min.	$2.15	$ .71	$ .68	$ .64
LNC90	90 min.	$3.20	$1.00	$ .97	$ .95
LNC120	120 min.	$4.40	$1.61	$1.31	$1.21

Soft plastic box $ .07
Hard plastic box $ .11
Deluxe Hinged Cardboard Mailable Box $ .05

Performance Characteristics

DAK Low Noise—High Output Cassettes are especially recommended for the recording of music and in other situations where the signal-to-noise ratio and frequency response are extremely critical.

Shipping weight listed on order blank

Cassettes

low noise educational quality

DAK low noise educational cassettes are designed with the educator and duplicator in mind. They employ a fine particle dispersion, are highly calendered, and have inherent low noise characteristics. The mechanical components, utilized by these cassettes (and *all* other DAK cassettes) are of the unsurpassed quality decribed, in detail, on the "Test Check" page of this catalog.

Added features of the educational cassette:

1. Five-screw cassette that may be opened for editing,
2. Self-adhesive labels shipped unattached for easy typing,
3. Self-adhesive unattached outer box labels for easy identification,
4. Deluxe Norelco-style hard library box,
5. Cassette supplied in two-minute time increments.

Number designation refers to total playing time. Example: EC2 = two playing minutes . . . one minute per side.

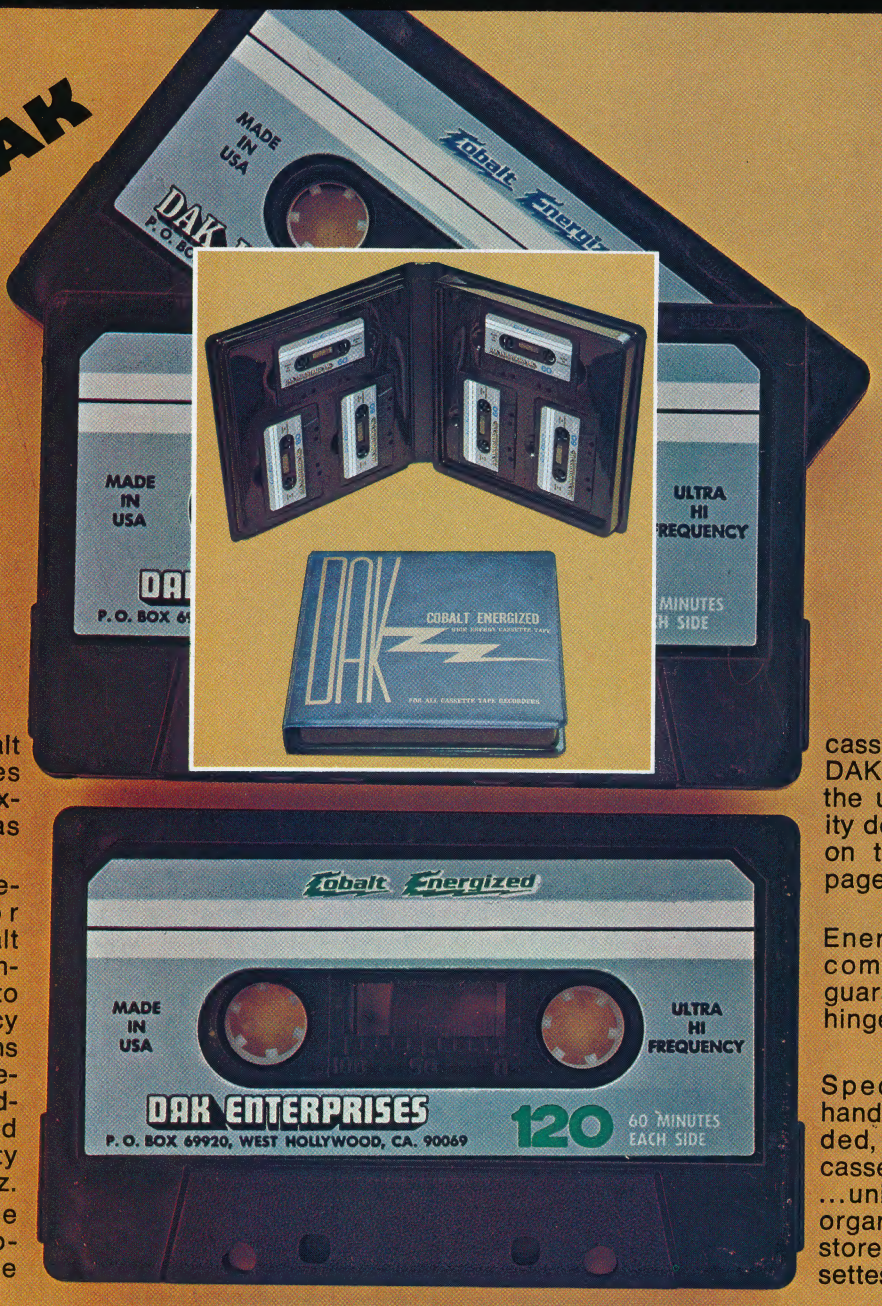
Stock Number	DAK direct prices! 1-48	49-143	144 +
EC 2	$0.60	$0.54	$0.51
EC 4	$0.60	$0.54	$0.51
EC 6	$0.60	$0.54	$0.51
EC 8	$0.60	$0.54	$0.51
EC10	$0.60	$0.54	$0.51
EC12	$0.62	$0.56	$0.53
EC14	$0.62	$0.56	$0.53
EC16	$0.62	$0.56	$0.53
EC18	$0.62	$0.56	$0.53
EC20	$0.62	$0.56	$0.53
EC22	$0.62	$0.56	$0.53
EC24	$0.64	$0.58	$0.54
EC26	$0.66	$0.59	$0.56
EC28	$0.68	$0.61	$0.58
EC30	$0.70	$0.63	$0.59
EC32	$0.72	$0.65	$0.61
EC34	$0.74	$0.67	$0.63
EC36	$0.76	$0.68	$0.65
EC38	$0.78	$0.70	$0.66
EC40	$0.80	$0.72	$0.68
EC42	$0.82	$0.74	$0.70
EC44	$0.84	$0.76	$0.71
EC46	$0.86	$0.77	$0.73
EC48	$0.88	$0.79	$0.75
EC50	$0.90	$0.81	$0.76
EC52	$0.92	$0.83	$0.78
EC54	$0.94	$0.85	$0.81
EC56	$0.96	$0.86	$0.82
EC58	$0.98	$0.88	$0.83
EC60	$1.00	$0.90	$0.85
EC62	$1.02	$0.92	$0.87
EC64	$1.04	$0.94	$0.88
EC66	$1.06	$0.96	$0.90
EC68	$1.08	$0.98	$0.92
EC70	$1.10	$0.99	$0.93
EC72	$1.12	$1.01	$0.95
EC74	$1.14	$1.03	$0.97
EC76	$1.16	$1.04	$0.99
EC78	$1.18	$1.06	$1.00
EC80	$1.20	$1.08	$1.02
EC82	$1.22	$1.10	$1.04
EC84	$1.24	$1.12	$1.05
EC86	$1.26	$1.13	$1.07
EC88	$1.28	$1.15	$1.09
EC90	$1.30	$1.17	$1.10
EC92	$1.32	$1.19	$1.12
EC94	$1.36	$1.22	$1.16
EC96	$1.38	$1.24	$1.17
EC98	$1.40	$1.26	$1.19
EC100	$1.42	$1.28	$1.21
EC102	$1.44	$1.30	$1.22
EC104	$1.46	$1.31	$1.24
EC106	$1.48	$1.33	$1.26
EC108	$1.50	$1.35	$1.27
EC110	$1.52	$1.37	$1.29
EC112	$1.54	$1.39	$1.31
EC114	$1.56	$1.40	$1.33
EC116	$1.58	$1.42	$1.35
EC118	$1.60	$1.44	$1.37
EC120	$1.62	$1.46	$1.39
EC122	$1.64	$1.48	$1.41

Shipping weight listed on order blank

Cassettes

ultra high frequency

***New From DAK**



DAK's new Cobalt Energized Cassettes make chromium dioxide and special bias switches obsolete.

Without any special circuitry or switches, DAK's Cobalt Energizing adds an impressive 3 to 5 db to the high end frequency response. That means more brilliant and true-to-life cassette recordings from now on. And a response capability in excess of 22,000 Hz.

In addition, the mechanical components utilized by these cassettes (and *all other* DAK cassettes) are of the unsurpassed quality described, in detail, on the "Test Check" page of this catalog.

ALL DAK Cobalt Energized Cassettes come with a lifetime guarantee in a deluxe hinged crystal box.

*Each DAK 6-Pak Special includes a handsome, richly padded, "midnight blue" cassette display case ...uniquely designed to organize, protect, and store up to 6 DAK cassettes.

Cobalt Energized

stock #	playing time	retail value	DAK direct prices! 1-48	49-143	144 . . .	*6-Pak Special
HEC 40	40 min.	$2.15	$1.15	$1.08	$1.00	$6.90
HEC 60	60 min.	$2.50	$1.35	$1.30	$1.25	$8.10
HEC 90	90 min.	$3.75	$1.78	$1.68	$1.58	$10.98
HEC 120	120 min.	$4.75	$2.65	$2.55	$2.45	$15.90

Shipping weight listed on order blank

DAK Open-Reel

standard output

DAK now offers professional quality, open-reel magnetic tape at tremenous savings.

All DAK Standard Output Recording Tape is a precisely formulated, fine quality, polyester base tape. It is silicone lubricated, splice free, and available in the 4 most commonly used configurations of ½ mil, ¾ mil, 1 mil, and 1½ mil. □ DAK's Standard Output Tape is highly recommended for all general voice and music recording and is sold with an unconditional money-back guarantee.

All 5", 7", & 10½" reels are available in either the standard hinged DAK box or a plain white hinged box. Please indicate preference by placing key letters (D) for DAK box or (W) for white box in front of the product stock number on your order blank.

precision recording tape

DAK direct prices!

stock #	reel	length	value	1-9	10-23	24-49	50-99	100 . . .
1½ mil Precision Polyester								
1200-05B	5"	600'	$ 2.65	$ .65	$ .60	$ .55	$ .50	$ .45
1200-07B	7"	1200'	$ 4.25	$1.25	$1.10	$ .95	$ .90	$ .85
1200-10B	10½"	2400'	$11.55	$4.00	$3.70	$3.40	$3.20	$3.00
1200-14B	14"	4800'	$25.00	$6.50	$6.00	$5.75	$5.50	$5.25
1 mil Precision Polyester								
1150-05G	5"	900'	$ 3.60	$1.25	$1.00	$ .90	$ .80	$ .75
1150-07G	7"	1800'	$ 6.20	$1.50	$1.25	$1.15	$1.00	$ .95
1150-10G	10½"	3600'	$14.35	$4.50	$4.00	$3.80	$3.50	$3.40
1150-14G	14"	7200'	$30.95	$8.00	$7.75	$7.50	$7.00	$6.85
¾ mil Precision Polyester								
1051-05W	5"	1200'	$ 5.45	$1.70	$1.50	$1.30	$1.15	$1.00
1051-07W	7"	2400'	$ 9.50	$2.00	$1.80	$1.60	$1.40	$1.25
1051-10W	10½"	4800'	$22.00	$5.50	$4.88	$4.48	$4.20	$4.00
1051-14W	14"	9600'		$10.90	$9.76	$8.88	$8.20	$7.90
½ mil Precision Polyester								
1350-05N	5"	1800'	$ 4.95	$2.25	$1.95	$1.85	$1.80	$1.75
1350-07N	7"	3600'	$ 8.25	$3.25	$2.95	$2.85	$2.80	$2.75

Shipping weight listed on order blank

DAK Open-Reel

low noise—high output

DAK Hinged Box (no extra cost)

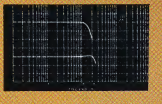
White Hinged Box (no extra cost)

DAK Low Noise—High Output Magnetic Recording Tape offers the same excellent high frequency response and headroom associated with other high-performance tapes (like Scotch 207) . . . but at a much more affordable price.

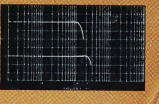
In its May '73 issue, *Audio Magazine* tested DAK's new Low Noise—High Output tape along with several other well-known brands, including Scotch 207. Their conclusions about DAK: ". . . an inexpensive tape with excellent frequency response, good headroom . . ."

This professional quality, open-reel mastering tape utilizes a heavy-duty binder, a special silicone lubricant, and a fine quality polyester base tape to provide consistently low background-hiss level and unusually long tape life. Low Noise—High Output DAK Magnetic Recording Tape is *the* perfect tape for critical mastering or sub-mastering. It is available in 2 splice-free configurations and is sold with an unconditional money-back guarantee.

All 5", 7", & 10½" reels are available in either the standard hinged DAK box or a plain white hinged box. Please indicate preference by placing key letters (D) for DAK box or (W) for white box in front of the product stock number on your order blank.



DAK Low Noise—High Output



Scotch 207

(Actual unretouched photos from *Audio Magazine's* article.)

precision recording tape

1½ mil High Output Polyester

DAK direct prices!

stock #	reel	length	value	1-9	10-23	24-49	50-99	100 . . .
0210-05B	5"	600'	$ 2.85	$1.25	$1.00	$ .90	$ .80	$ .75
0210-07B	7"	1200'	$ 5.30	$1.75	$1.55	$1.40	$1.24	$1.14
0210-10B	10½"	2400'	$13.90	$5.00	$4.60	$4.30	$3.98	$3.78
0210-14B	14"	4800'	$27.50	$8.00	$7.50	$7.00	$6.70	$6.20

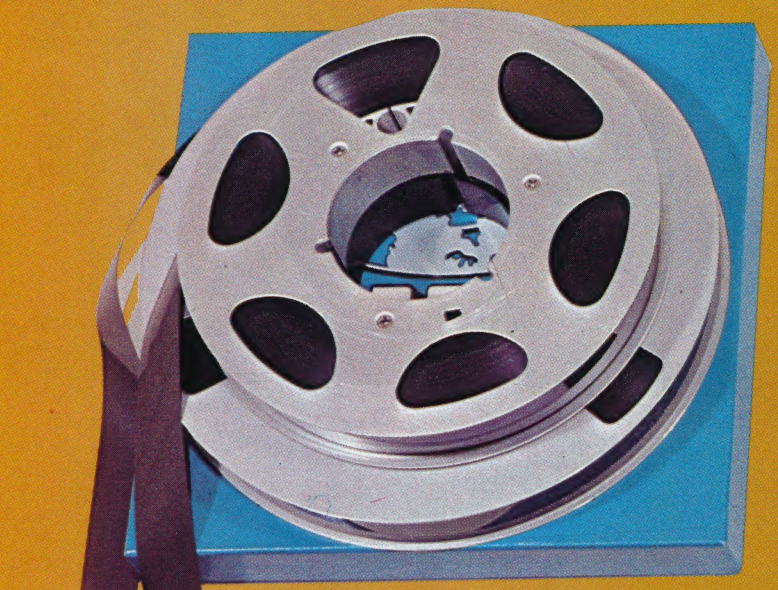
1 mil High Output Polyester

0951-05G	5"	900'	$ 4.25	$1.70	$1.50	$1.30	$1.15	$1.00
0951-07G	7"	1800'	$ 7.35	$2.25	$1.94	$1.80	$1.64	$1.50
0951-10G	10½"	3600'	$17.15	$6.00	$5.38	$5.10	$4.78	$4.50
0951-14G	14"	7200'	$34.05	$9.76	$8.88	$8.60	$8.20	$7.90

Shipping weight listed on order blank

Video Tape

Cobalt energized helical scan video tape



Special

You may purchase any of the f
right at a 25% discount if you
higher dropout rate than our firs
fications are identical. Simply
deduct 25% from your order.

cobalt energized

width	Reel Size	Reel Length	Playing Time	List Price		DAK Price
½″	7″	2400′	60 min.	$39.95	1-9	$16.50
					10-49	$14.00
					50+	$13.25
½″	7″	1200′	30 min.	$21.95		$10.50
½″	5⅛″	1210′	30 min.	$21.95		$10.00
½″	5″	800′	20 min.	$14.65		$ 9.50
1″	8″	2150′	60 min.	$45.00		$21.50
1″	9¾″	3000′	60 min.	$60.00		$28.50

Shipping weight listed on order blank

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ideo tape at
tape with a
other speci-
nd line and

Newly developed third generation DAK cobalt energized helical scan video tape has achieved a new level of reliability and durability. Its unique cobalt doped ultra-small ferric iron particles (compatible with all video recorders) are aligned in an exclusive process, that insures the most complete particle alignment, which insures the best possible signal to noise ratio and best color compatibility.

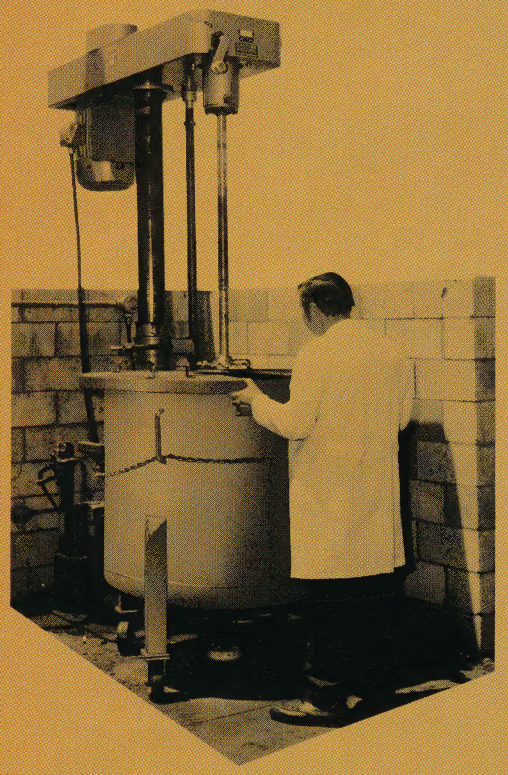
DAK's cobalt video formula incorporates the finest plasticizers, binders, and lubricants to maximize tape head life; and, at the same time, offers multi-hour still frame capability.

Finally, DAK employs the newest technique in the surface finishing to minimize oxide ruboff. 7″ reels of ½″ video tape come packaged in a deluxe padded midnight blue vinyl library case. All other configurations come in deluxe pebbletone cardboard boxes.

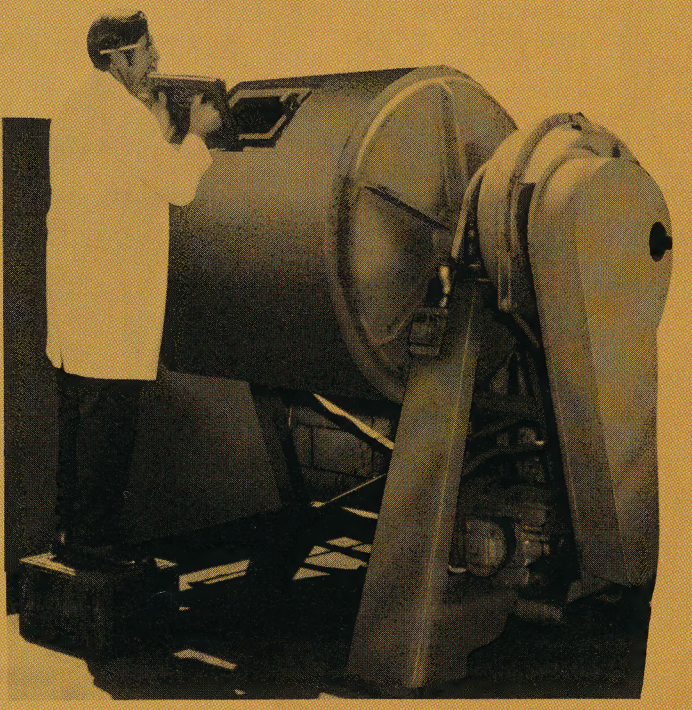
Manufacturing

introduction premix ball mill

Magnetic tape is composed of some twelve to fifteen different components. Basically, they can be broken down into four categories. The first category, of course, is the polyester base material, to which all of the following are applied. The second is the iron oxide for sound reproduction and carbon (which is an insulating material) for insulating the individual iron oxide particles. The third is a series of binders which hold the oxide to the polyester film and vinyls which stop the binder from becoming too hard and brittle (causing oxide flaking and poor tape flexibility). The fourth set of ingredients are the lubricants and smoothness components which allow for smooth tape travel, good head-to-tape contact, minimal head wear, and low friction. All of these components combine to form the high quality magnetic tape of today.



All soft solid and liquid components begin their journey to becoming magnetic tape in an agitation tank (much like an electric blender) where they are thoroughly mixed with high speed and heat to begin the chemical reactions that form the binding systems. (The binding system holds the iron oxide to the polyester.) The tank holds over three hundred gallons and must agitate many hours to produce the chemical reactions required to form strong binders.



The solid chemicals are placed directly in the ball mill (which turns much as a cement mixer or tumbler) and the premix from the dispersion tank is added. It is called a ball mill because it contains five thousand pounds of steel ball bearings, which grind and regrind the iron and other components as the mill turns. The tremendous pressure from the weight of the balls and constant rotation cause the mixture to become completely homogenous and reduce the size of any one particle to less than one micron. After some 24 to 60 hours (depending on the type of mix, audio or video) the contents of the mill are pumped through a series of filters ranging down to one micron. Filtration is very important. For example, in video tape a seventeen-micron piece of foreign material will cause a visable dropout. After leaving the ball mill and being filtered, the oxide must be kept under constant agitation to keep the components from settling out or separating.

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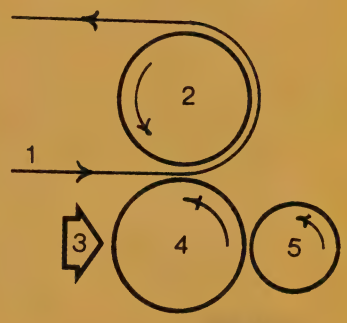
Manufacturing

precision coating

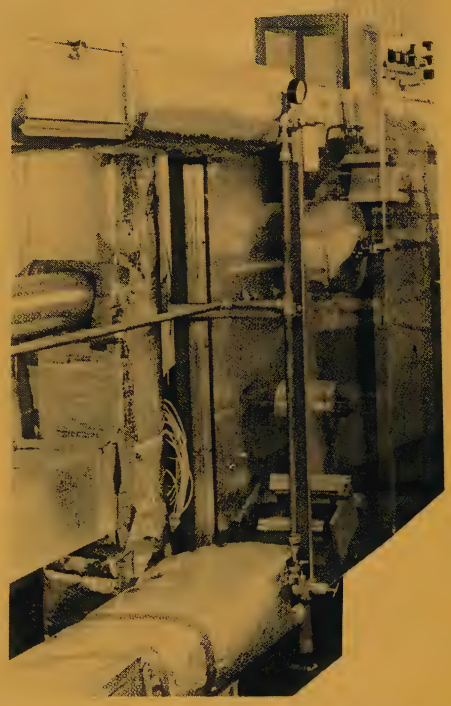
The heart of any tape plant is the actual coating of the polyester film with the iron oxide. This is accomplished on one of three coating systems — reverse roll, knife, or gravier. Two are pictured. The entire coating environment utilizes clean room air systems (all audio and video coaters are housed in the same environment) to eliminate dust particles. In the reverse roll, the film (1) travels around the drive roller (2). The oxide (3) is spread onto the transfer roller (4), and the distance between the transfer roller (4) and the meter roller (5) will determine the ultimate thickness of the oxide coating. The name "reverse roll" evolves from the method by which the oxide is transferred from the transfer roller (4) to the polyester film (1). The film is traveling in the opposite or reverse direction to the transfer roll, and the distance between the transfer roll (4) and the drive roll (2) is the exact thickness of the polyester film. Therefore, the oxide has nowhere to go but onto the film.

The coated tape then passes through a magnetic orientation field and then through 40 to 50 feet of drying tunnels to a take-up system that winds the tape into a web (spool), aligning each layer exactly on top of the last. A scatter wind (a wind where each layer is not exactly straight with the preceding layer) at this point would result in poor slitting later and cause rejection of the tape.



Knife coating requires exacting tolerance and extreme caution in cleanliness. The entire coating environment utilizes clean room air systems (all audio and video coaters are housed in the same environment) to eliminate dust particles. The coating system, although simpler in design than the reverse roll, is actually much more difficult in operation. It consists of a steel knife mounted on a plate, with the polyester running between the two. The oxide flows across the back of the knife, and the distance between the knife and the polyester film determine the coating thickness. Any variation in film thickness or dust particles will cause the tape not to be coated.

The coated film then passes through a magnetic field and then through a 50 foot drying oven. At no time does the coated film come into contact with any guides, rollers, etc. in the oven. It travels on a layer of pressurized air, much as the new transportation systems that ride on a cushion of air. In this way, no friction or scratches may be picked up in the new coated film. The take-up, as on the reverse roll coaters, aligns each layer of film exactly over the last with no sliding or slipping that may mar the coated surface.



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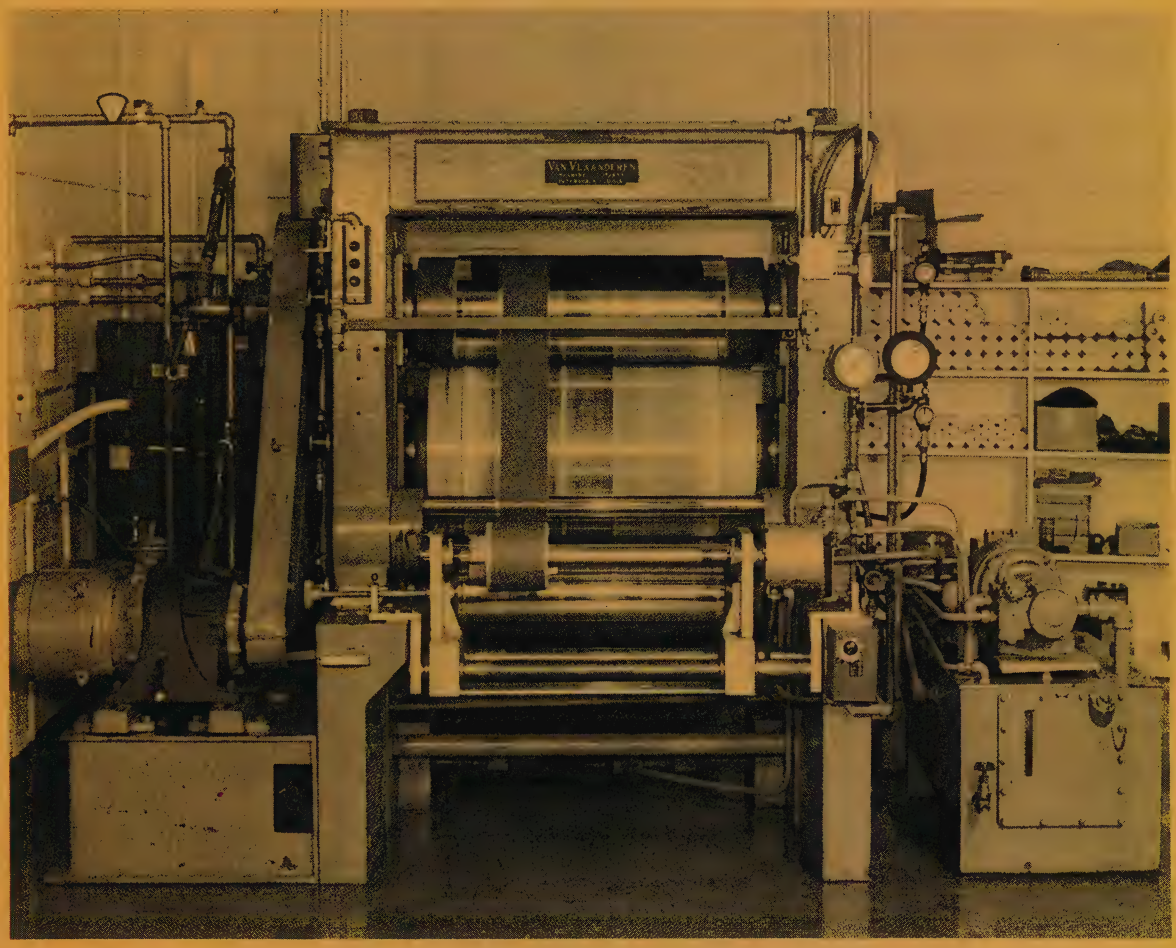
Manufacturing

calendering



Calendering is probably the least understood by the consumer of all the functions of a tape plant. All video tape, most good cassette tape, and some good audio tape is calendered. Calendering is what gives tape the smooth, glossy appearance on the oxide side.

As you know, if your tape heads are dirty, you lose frequency response. A rough surface causes virtually the same effect as dirty heads. It prevents intimate tape head contact with the main body of the tape. When tape is coated, it has millions of microscopic peaks and valleys. Calendering eliminates the peaks and valleys, causing a very smooth surface. In addition, since there are no rough peaks, there is less oxide ruboff and less head wear.

All of this is caused by two interacting systems, heat and pressure. In the pictures above, you will note that a calendar has two chrome rollers separated by a compressed cotton roller. The chrome rollers are heated to temperatures of between 160 and 210 degrees. The tape then passes between both chrome rollers and the cotton roller. External pressure of up to fifty tons (100,000 pounds) is applied. This combination of pressure and heat causes the peaks to be compressed into the valleys, causing the mirror surface finish of today's fine tapes. The difference between the same tape calendered or uncalendered can be more than ten db at the upper frequencies.

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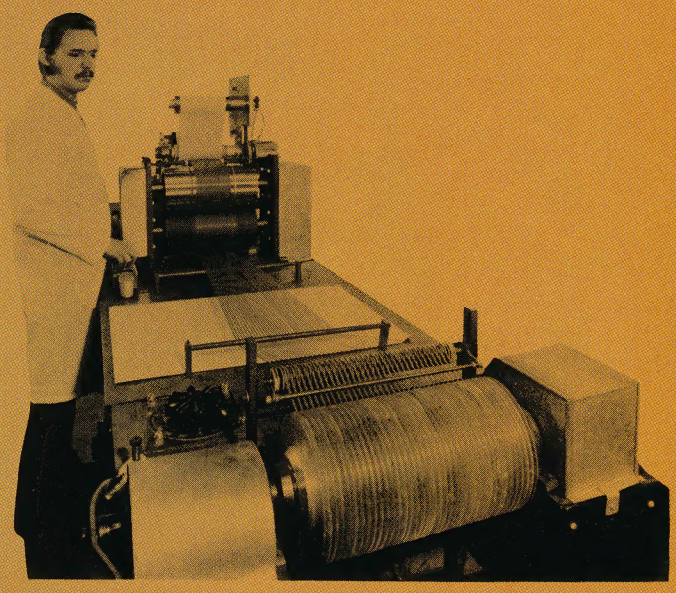
Manufacturing

splicing

If you have ever looked at the beginning or end of a cassette, you will notice a colored or clear leader. The reason for the leader is that cassette tape is too thin and delicate to withstand the stress of the fast forward and rewind stopping at the end of the cassette. C30 and C60 cassette tapes are ½ of one thousandth (.00050) of an inch thick. C90 cassette tape is ⅓ of one thousandth (.00033) of an inch thick. C120 cassette tape is ¼ of one thousandth (.00025) of an inch thick. Leader tape is 1 or 1½ of one thousandth (.001/.0015) of an inch thick.

Web splicing is one of those times when mass production not only is far more economical but also produces an infinitely superior product. When 6″ or 12″ webs are spliced, rather than splicing the tape to the leader as the ⅛ tape is run into the individual cassette, a perfect splice is made, because when the web is later slit, the magnetic tape and splice and leader are cut together so that the spliced area is exactly the same width as the tape. When the tapes are spliced individually to the leader in the cassette, the splicing tape is likely to be too narrow or too wide. If the tape is too narrow, the tape may tend to tear or catch at the splice. If the tape is too wide or one edge sticks out, the cassette will hang up at the splice. If you pull the splice slightly out of the cassette and carefully examine it, it is an easy matter to decide which method was used. Many small jobbers who buy cassette housings from one source and tape from another use the single splicing method. A few majors do use the single splice method in part, especially for odd length cassettes.

slitting



Slitting is one of the most difficult of the manufacturing operations. Tolerances must be to two thousandths of an inch, and the tape must not wander from side to side. If the tape should cup or bend (remember, you may be working with film ¼ of a thousandth of an inch thick), the product will be ruined, and all of the precautions taken in the other operations will be wasted.

The secret is exact web guiding, controlled tension, and proper alignment and built-in compensation to take into account web variation, etc.

The actual cutting is accomplished by intermeshing, rotating blades built to tolerances of up to one millionth of an inch. The entire engagement of the blades is often less than two thousandths of an inch. Both edges of the web are discarded to eliminate edge flucuations that occur in the coating operation and only the "heart cuts" are used. Over 90 percent of the reject tape is in the outside ½ inch on each side of the web, so it is discarded. This is the final step for reel-to-reel audio tape. Video tape passes along through an additional cleaning operation, and cassette tape passes along to the cassette assembly area.

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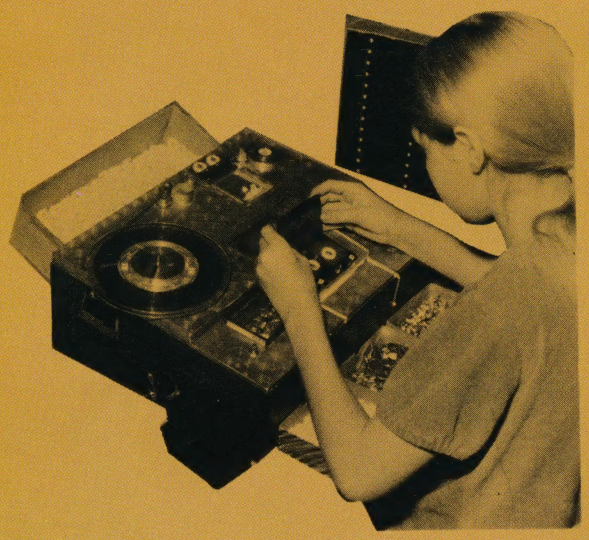
Manufacturing

assembly



Each cassette must be individually assembled. An automated winder winds the tape onto the cassette hubs while the operator puts in the stainless steel pins, flanged rollers, mu-metal shield, pressure pad, and graphite-coated polyester slip sheets. The tape, already being leadered, is wound on a photoelectric winder and therefore, the individual operator has no control on the length of the cassette. It is all precontrolled back at the web leadering area where exact lengths can be controlled.

After the cassettes are assembled, they must be sealed. Two methods are available. The first, sonic sealing uses ultra-high frequency sound, much like an electronic oven, which melts a small bead of plastic around the edge of the cassette. Up to 11,000 cassettes may be sealed per day by one operator. The second method is using five screws driven by an automatic screw driver. Only approximately 2,000 may be assembled per day per operator, hence the significantly higher price. Today, many people are switching to sonic sealed cassettes, and should a failure occur, buying spare screw housings to reassemble the defective cassettes. Finally, the cassette will proceed to the labeling and packaging departments.

quality control

A random check of each batch (a completely mixed formula or recipe) from each ball mill, of each video web, and of each audio web finds its way to one of the Quality Control Labs. In the manufacture of magnetic tape, each aspect of the manufacturing must be carefully scrutinized. The lab above is a general comparison lab. Half-inch, one-inch, or two-inch video tape may be viewed or evaluated. Eighth-inch and quarter-inch audio tape may be viewed or evaluated. Eighth-inch and quarter-inch audio tape may be analyzed in depth. This equipment prints charts of frequency response, gives distortion information, etc.

Consistency is the all-important byword of Quality Control. Other labs not pictured perform wear tests, life tests, dropout tests, microscopy, chemical variations, tension, packing, etc. Often as much money may be invested in checking and evaluating a tape product as in manufacturing it.

In all, the tape manufacturing process is a series of complex steps leading to the superior magnetic tape products we have today. Tape has been showing a tremendous quality increase over the last few years — first with better irons, then calendering, then chromium dioxide, and now with cobalt and the new irons.

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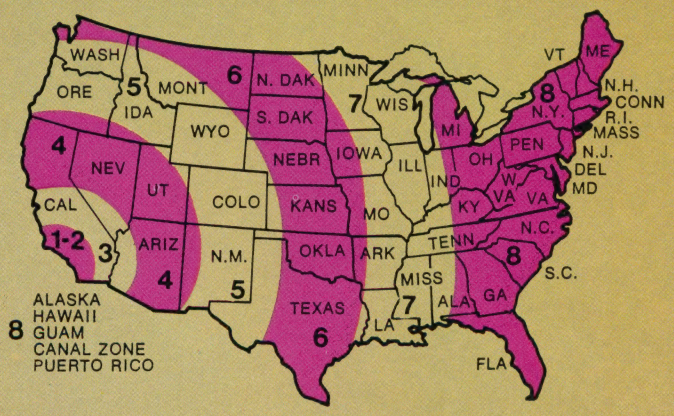
each cassette weighs 4 ozs.
cassette 6 pak weighs 32 ozs.
14″ reels weigh 4 lbs. 6 ozs.
10½″ reels weigh 2 lbs. 8 ozs.
7″ reels weigh 13 ozs.
5″ reels weigh 9 ozs.
7″ ½″ video weighs 36 ozs.
5″ ½″ video weighs 18 ozs.
8″ 1″ video weighs 56 ozs.
9¾″ 1″ video weighs 80 ozs.



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8	.85	1.08	1.20	1.37	1.64	1.95	2.29	2.65
10	.93	1.20	1.35	1.55	1.88	2.26	2.68	3.13
12	1.01	1.32	1.50	1.73	2.12	2.57	3.07	3.61
14	1.09	1.44	1.65	1.91	2.36	2.88	3.46	4.09
16	1.17	1.56	1.80	2.09	2.60	3.19	3.85	4.57
18	1.25	1.68	1.95	2.27	2.84	3.50	4.24	5.05
20	1.33	1.80	2.10	2.45	3.08	3.81	4.63	5.53
22	1.41	1.92	2.25	2.63	3.32	4.12	5.02	6.01
24	1.49	2.04	2.40	2.81	3.56	4.43	5.41	6.49
26	1.57	2.16	2.55	2.99	3.80	4.74	5.80	6.97
28	1.65	2.28	2.70	3.17	4.04	5.05	6.19	7.45
30	1.73	2.40	2.85	3.35	4.28	5.36	6.58	7.93
32	1.81	2.52	3.00	3.53	4.52	5.67	6.97	8.41
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